ALGEBRA 2 Name:_____

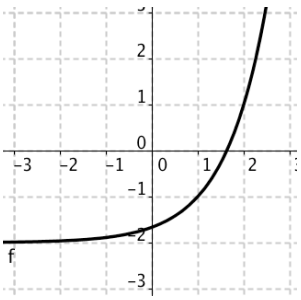
A Finely Crafted Unit 6 Opportunity Day Rough Draft

Technology Section: You may use a calculator and Geogebra. Use a pencil. Show all work and circle your answer. Use your time wisely; you will be able to earn additional credit after the timed portion of the test by completing Supercorrections. When you finish, put away your technology and you can come up to get the non-technology part—you may continue to work on both sections without the aid of technology.

1. Go to ThatQuiz and answer the questions.	2. Go to ThatQuiz and answer the questions.
_____ out of 4	_____ out of 4

3. The population of Springfield was 5,025 in 2011 and was growing at the rate of 3.2% per year. The city planners want to know what the population will be in the year 2025. Find an estimate of this population. Be sure to show your working!

4. The graph of the function $f(x) = 3^{x-1} - 2$ is shown at right. Show how to find the *x*-intercept and the *y*-intercept from the equation of the function, without using Geogebra. Be sure to check your answer with Geogebra, though!



5. Tell whether each function represents exponential growth or decay.

a. $f(x) = 3.6(1.01)^x$ b. $g(t) = 0.015(1.23)^t$ c. $h(t) = \left(7\frac{3}{4}\right)\left(\frac{5}{8}\right)^t$ d. $j(x) = 2500(0.25)^x$

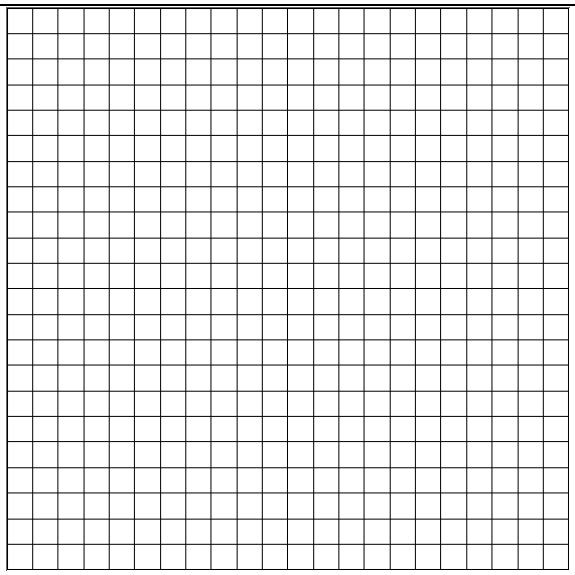
6. Two functions are inverses if their graphs are reflections across the line $y = x$.

a. Graph $y = x$ on the grid at right.

b. Graph $f(x) = 2^x + 1$ on the grid at right.

c. Graph $g(x) = \log_2(x - 1)$ on the grid at right. [Hint: To graph a base 2 logarithm in Geogebra, use the change of base formula!]

d. Are *f* and *g* inverses?



7. Mr. O'Brien has $5000 to invest for 10 years at a 5.6% annual interest rate. Using the formulas $A = P\left(1 + \frac{r}{n}\right)^{nt}$ or $A = Pe^{rt}$ as appropriate, find the value of his investment if it is compounded:

a. annually b. quarterly c. daily d. continuously

8. Evaluate each expression to the nearest thousandth.

a. $e^{3.4}$ b. $\ln \pi$ c. $e^{-3.25}$ d. $\ln\left(e^{1.618}\right)$

9. Solve the equation for *x*.

$2 + \log_5(x + 3) = 1$

10. Do the steps to solve the equation for x.

Equation to solve: $\log x + \log(x+3) = 1$

Step 1: Combine LHS to one log. _____

Step 2: Exponentiate both sides with base 10. _____

Step 3: Use inverse property to simplify LHS. _____

Step 4: Set equal to zero. _____

Step 5: Factor. _____

Step 6: Use Zero Product Property to solve. _____

Step 7: Check answers and circle the correct one. _____

11. Write each logarithmic equation in exponential form and each exponential equation in logarithmic form.

a. $\log_3 81 = 4$ b. $2^8 = 256$ c. $e^x = 5$ d. $\ln x = 4$

12. Find the value of v.

a. $3 = \log_v 343$ b. $\log_9 729 = v$ c. $\log_6 v = 3$

13. Write each expression as a single logarithm. Then simplify, if possible.

a. $\log_2 5 - 3\log_2 3 + \log_2 6$

b. $\log_7 \frac{1}{4} + 2\log_7 4 - \frac{1}{2}\log_7 16$

14. Evaluate each expression.

a. $5^{\log_5 32}$

b. $\log_6 36$

c. $\log_9 9^{\frac{2}{3}}$

d. $\log_b b^{(x-2)}$

15. Explain to an 8th grader what $\log_2 15$ *means*. Be sure to tell them what number it approximately *equals*.

Go back and check your answers!